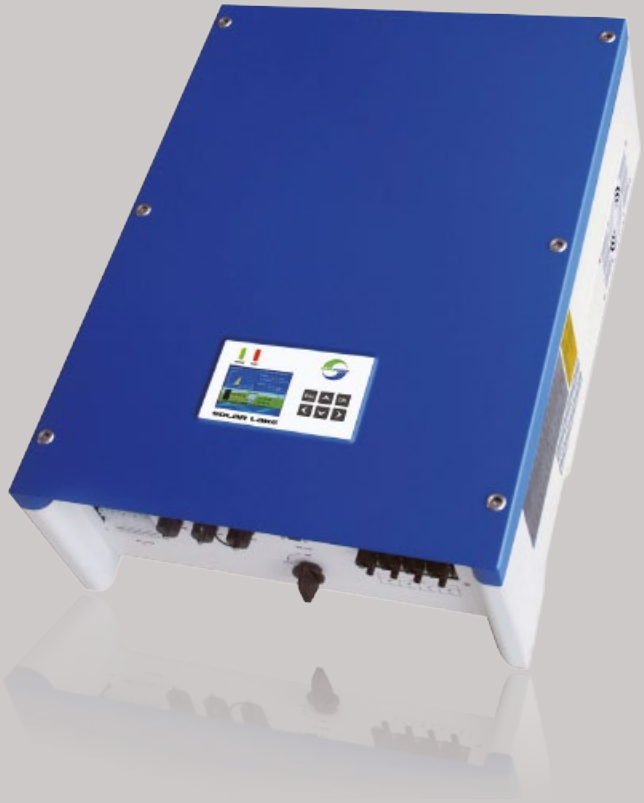
enertik

Distribuidor exclusivo en Argentina

SAMIL POWER™

Expert for PV Grid-tied Inverters



SolarLake PV Grid-tied Inverter

User Manual

Contents

1 NOTES ON THIS MANUAL.....05

1.1 SCOPE OF VALIDITY.....05

1.2 TARGET GROUP.....05

1.3 SYMBOLS USED.....05

2 SAFETY.....07

2.1 APPROPRIATE USAGE.....07

2.2 IMPORTANT SAFETY INSTRUCTIONS.....07

2.3 EXPLANATION OF SYMBOLS.....08

3 INTRODUCTION.....10

3.1 BASIC FEATURES.....10

3.2 ELECTRICAL BLOCK DIAGRAM.....10

3.3 DIMENSION.....11

4 TECHNICAL DATA.....12

4.1 INPUT (DC).....12

4.2 OUTPUT (AC).....12

4.3 EFFICIENCY, SAFETY AND PROTECTION.....13

4.4 GENERAL DATA.....13

5 INSTALLATION.....14

5.1 PACKAGING.....14

5.2 INSTALLATION PRECAUTION.....15

5.3 PREPARATION.....16

5.4 INSTALLATION STEPS.....16

5.5 CONNECTIONS OF THE PV POWER SYSTEM.....17

5.6 RUN THE INVERTER.....21

6 OPERATION METHOD.....22

6.1 CONTROL PANEL.....22

6.1.1 LCD COMMISSIONING SETUP OPERATION STEPS.....24

6.1.2 MAIN MENU INTRODUCTION.....27

6.1.3 AUTOTEST PROCEDURE- ITALY ONLY.....28

6.2 LCD FUNCTION.....29

7. COMMUNICATION AND MONITORING.....34

7.1 COMMUNICATION INTERFACE.....34

7.2 COMMUNICATION.....34

8 TROUBLESHOOTING.....35

8.1 TROUBLESHOOTING.....35

8.2 ROUTINE MAINTENANCE.....38

9 DECOMMISSIONING.....39

9.1 DISMANTLING THE INVERTER.....39

9.2 PACKAGING.....39

9.3 STORAGE.....39

9.4 DISPOSAL.....39

10 CONTACT SAMIL POWER.....40

1 Notes on This Manual

This manual is an integral part of the inverter, Please read the product manual carefully before installation, operation or maintenance. Keep this product manual for future reference. Please note that all pictures are edited by Samil Power.

1.1 Scope of Validity

This product manual describes the assembly, installation, commissioning, maintenance and failure search of the following Samil Power SolarLake Series inverters.

SolarLake 10000TL SolarLake 12000TL

SolarLake 15000TL SolarLake 17000TL

Keep this manual where it will be accessible at all times.

Product label

The product label provides basic information of the inverter, which is attached to the right side of the inverter. Pay special attention to the type of inverter and other specifications.

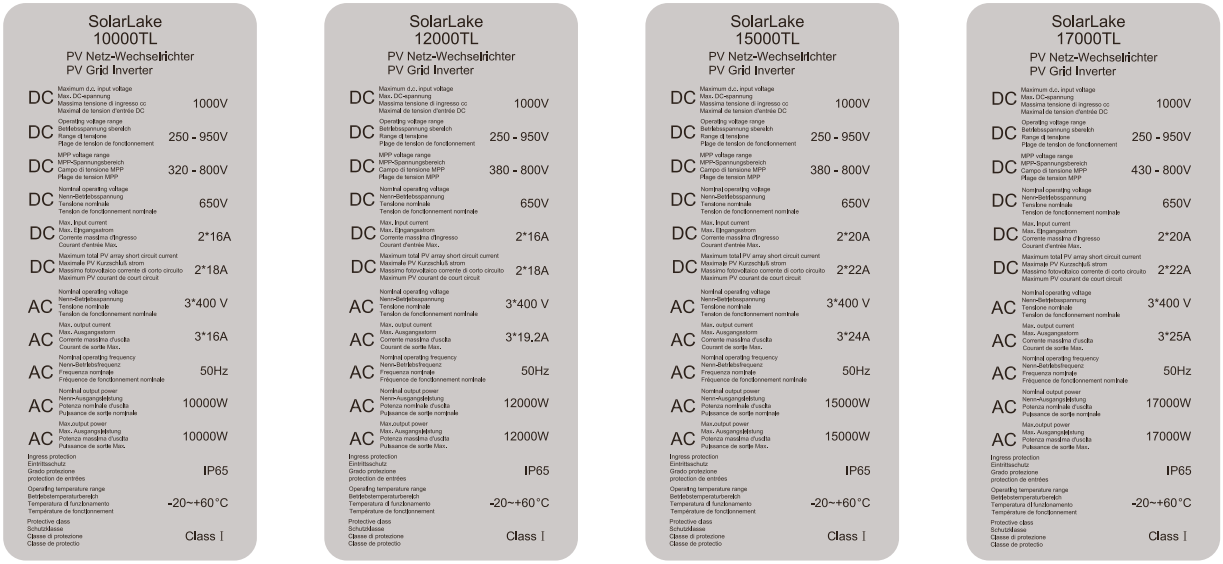


Figure 1 Labels for SolarLake 10000TL, SolarLake 12000TL, SolarLake 15000TL and SolarLake 17000TL (From left to right)

1.2 Target Group

This manual is for qualified person (support person, service person are qualified mentioned in this manual). The tasks described in this manual must only be performed by qualified person.

1.3 Symbols Used

The following types of safety instructions and general information appear in this document as described below.

Danger!
Danger indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Warning!
Warning indicates a hazardous situation which, if not avoided, could result in death or serious injury.

Caution!
Caution indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Note!
Note provides tips that are valuable for the optimal operation of user product.

2 Safety

2.1 Appropriate Usage

The SolarLake Series is a PV inverter which converts the DC current of a PV generator into AC current and feeds it into the public grid.

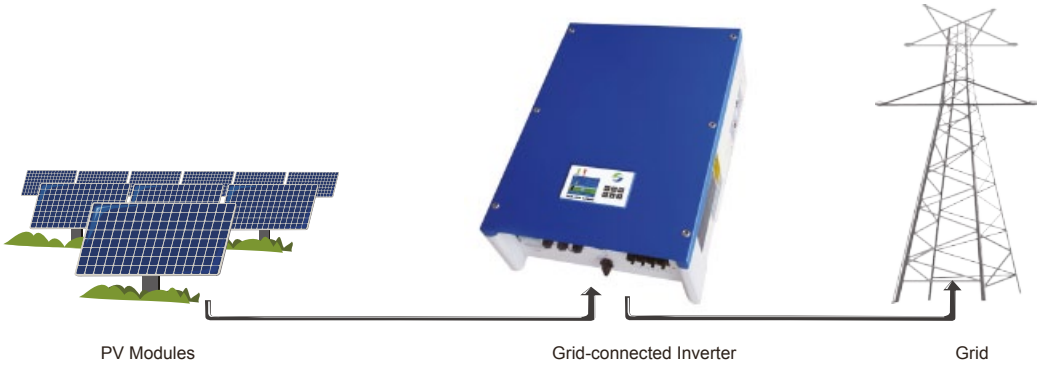


Figure 2 PV Grid-connected System

2.2 Important Safety Instruction

Danger!

Danger to life due to high voltages in the inverter!

•All work on the inverter must be carried out by qualified personnel only.

•The appliance is not to be used by children or persons with reduced physical sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.

•Children should be supervised to ensure that they do not play with the appliance.

Caution!

Danger of burn injuries due to hot enclosure parts!

During operation, the upper lid of the enclosure and the enclosure body may become hot.

Caution!

Possible damage to health as a result of the effects of radiation!

•Do not stay closer than 20 cm to the inverter for any length of time.

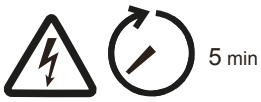
Note!

Grounding the PV generator. Comply with the local requirements for grounding the PV modules and the PV generator. Samil Power recommends connecting the generator frame and other electrically conductive surfaces in a manner which ensures continuous conduction and ground these in order to have optimal protection of the system and personnel.

2.3 Explanation of Symbols

This section gives an explanation of all the symbols shown on the inverter and on the type label.

●Symbols on the Inverter

Symbol	Explanation
	Danger to life due to high voltages in the inverter! There is residual voltage in the inverter. The inverter requires 5 minutes to discharge. • Wait 5 minutes before user open the upper lid or the DC lid.

● Symbols on the Type Label

Symbol	Explanation
CE	CE mark. The inverter complies with the requirements of the applicable CE guidelines.

● Important Safety Instructions

When using the product, please do remember the below information to avoid the fire, lightning or other personal injury:

Warning!

Ensure input DC voltage ≤ Max. input DC voltage .Over voltage may cause permanent damage to inverter or other losses, which will not be included in warranty! This chapter contains important safety and operating instructions. Read and keep this Operation Guide for future reference.

Warning!
Authorized service personnel must disconnect both AC and DC power from the SolarLake Series inverter before attempting any maintenance or cleaning or working on any circuits connected to the SolarLake Series inverter.

● Before using the SolarLake Series inverter, read all instructions and cautionary markings on the SolarLake Series inverter, and all appropriate sections of this guide.

● Use only attachments recommended or sold by Samil Power. Doing otherwise may result in a risk of fire, electric shock, or injury to persons.

● To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that wire is not undersized. Do not operate the SolarLake Series inverter with damaged or substandard wiring.

● Do not disassemble the SolarLake Series inverter. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the SolarLake Series inverter user self may result in a risk of electric shock or fire and will void user warranty.

● To reduce the risk of electric shock, authorized service personnel must disconnect both AC and DC power from the SolarLake Series inverter before attempting any maintenance or cleaning or working on any circuits connected to the SolarLake Series inverter. Turning off controls will not reduce this risk.

● Keep away from flammable, explosive materials to avoid fire disaster.

● The installation place should be away from humid or corrosive substance.

● To avoid electric shock accident, please do not disassemble the inverter because there are high-voltage capacitances installed inside the inverter. Fatal High-voltage will remain in the inverter after its disconnection with grid after 5 minutes.

● To reduce the chance of short-circuits, authorized service personnel must use insulated tools when installing or working with this equipment.

3 Introduction

3.1 Basic Features

Congratulations on user purchase of a SolarLake Series inverter from Samil Power. The SolarLake Series inverter is one of the finest inverter on the market today, incorporating state-of-the-art technology, high reliability, and convenient control features.

- Advanced DSP control technology.
- Utilize the latest high-efficiency power component.
- Optimal MPPT technology.
- 2 independent MPP trackers.
- Advanced anti-islanding solutions.
- Max. efficiency up to 98%, EU efficiency up to 97.6%.
- THD＜3%.
- Power factor adjustable arrange:+/-0.9.
- DC switch (optional).
- Grounding facility.
- Safety & Reliability: Transformerless design with software and hardware protection.
- IP65 protection.
- Friendly HMI.
- LED status indications.
- Multi language LCD display, Human-Machine interaction through button.
- RS485/RS232, Ethernet(USB and CAN is optional) communication interface.
- PC remote control.

3.2 Electrical Block Diagram

- **Electrical block diagram**

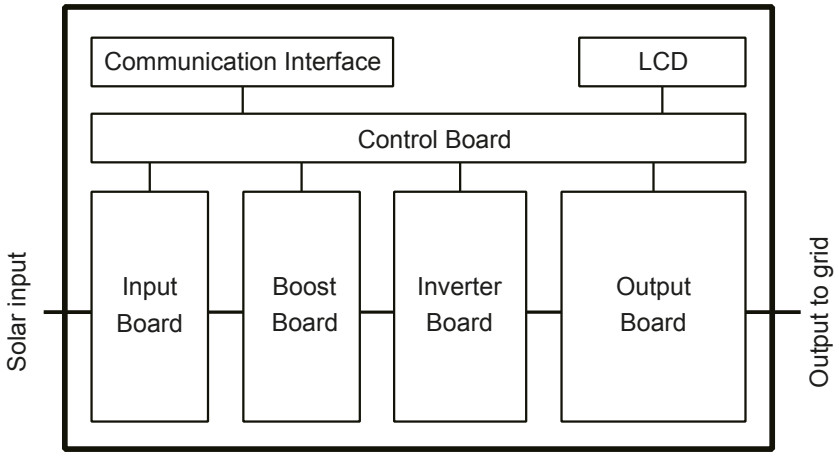


Figure 3 Electrical block diagram(DC switch is optional)

●Terminals of PV inverter

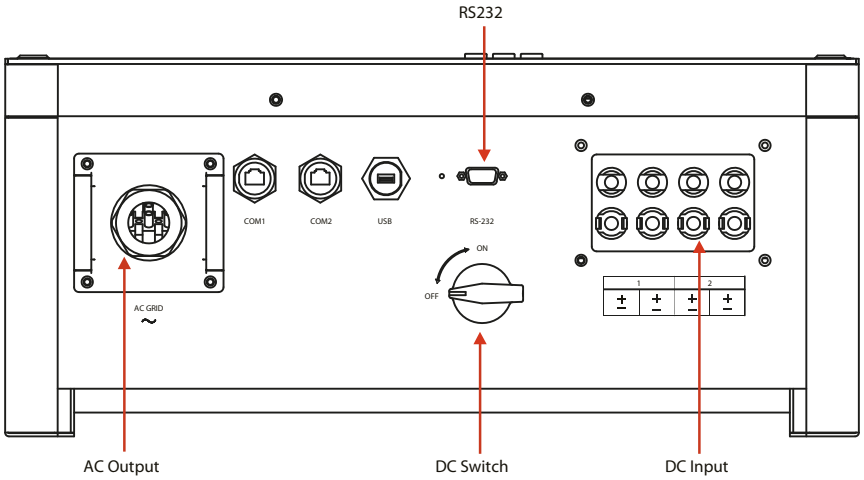


Figure 4　Terminals of PV inverter for 10 KW~17 KW(DC switch is optional)

Note: For safety reasons, the use of a DC switch is recommended. Between the PV modules and the power modules may be mandatory in some countries. Customers can select Samil Power SolarLake series inverters according to application requirements.

3.3 Dimension

●Dimension for SolarLake 10000TL, SolarLake 12000TL, SolarLake 15000TL and SolarLake 17000TL

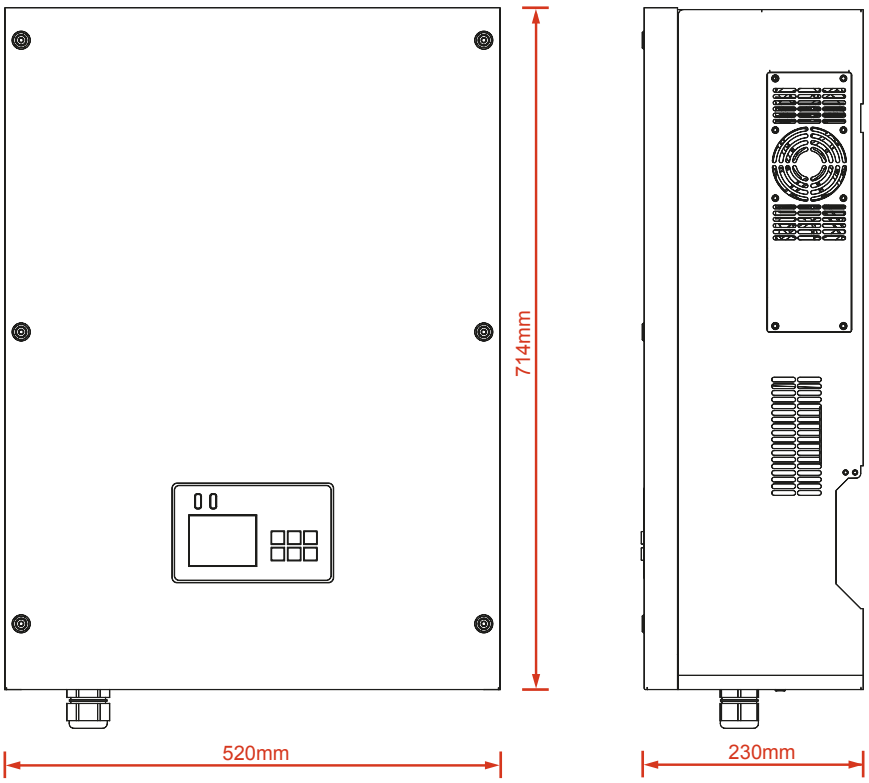


Figure 5　Overview of the inverters dimension

Note: The AC output terminal is most length part at the bottom of inverter, so take care of the AC output terminals, do not make it stand on the ground or other materials while moving or lifting the inverters, otherwise will make terminal damaged.

4 Technical Data

4.1 Input (DC)

Model	SolarLake 10000TL	SolarLake 12000TL	SolarLake 15000TL	SolarLake 17000TL
Max. recommended DC power [W]	10400	12500	15600	17600
Max.DC voltage [V]	1000	1000	1000	1000
Total max. input Current [A]	A:16/B:16	A:16/B:16	A:20/B:20	A:20/B:20
Number of MPP trackers / strings per MPP tracker	2/2	2/2	2/2	2/2
MPPT voltage range (at full power) [V]	320~800	380~800	380~800	430~800
Min. DC voltage /start voltage [V]	200/250	200/250	200/250	200/250

4.2 Output (AC)

Model	SolarLake 10000TL	SolarLake 12000TL	SolarLake 15000TL	SolarLake 17000TL
AC nominal power [W]	10000	12000	15000	17000
Max. AC power [W]	10000	12000	15000	17000
Max. AC current [A]	16	19.2	24	25
Nominal AC voltage [V]	3/N/PE, 230/400	3/N/PE, 230/400	3/N/PE, 230/400	3/N/PE, 230/400
AC grid freq. [Hz]	50	50	50	50
Power factor(cos)	0.9leading……. 0.9lagging	0.9leading……. 0.9lagging	0.9leading……. 0.9lagging	0.9leading……. 0.9lagging
Total harmonic distortion (THD)	<3%	<3%	<3%	<3%

4.3 Efficiency, Safety and Protection

Model	SolarLake 10000TL	SolarLake 12000TL	SolarLake 15000TL	SolarLake 17000TL
Max. efficiency	98.0%	98.0%	98.0%	98.0%
Euro-efficiency	97.6%	97.6%	97.6%	97.6%
MPPT efficiency	99.9%	99.9%	99.9%	99.9%
Overvoltage / Undervoltage protection	Yes	Yes	Yes	Yes
DC isolation impedance monitoring	Yes	Yes	Yes	Yes
Ground fault protection	Yes	Yes	Yes	Yes
Grid monitoring	Yes	Yes	Yes	Yes
Ground fault current monitoring	Yes	Yes	Yes	Yes
DC injection monitoring	Yes	Yes	Yes	Yes

4.4 General Data

Model	SolarLake 10000TL	SolarLake 12000TL	SolarLake 15000TL	SolarLake 17000TL
Dimension (W/H/D) [mm]	520*714*230	520*714*230	520*714*230	520*714*230
Weight [kg]	49	49	50	50
Cooling concept	Fan			
Noise emission (typical) [dB]	<45.8	<45.8	<45.8	<45.8
Operating temperature range [°C]	-20 °C ～ +60°C （Derating at 45 °C）			

Degree of protection	IP65			
Pollution Degree	II			
Topology	Transformerless			
Internal consumption (night) [W]	<5	<5	<5	<5
LCD display	3.5Inch, TFT-LCD	3.5Inch, TFT-LCD	3.5Inch, TFT-LCD	3.5Inch, TFT-LCD
Communication interfaces	RS485/RS232 / Ethernet; USB and CAN Optional	RS485/RS232 / Ethernet; USB and CAN Optional	RS485/RS232 / Ethernet; USB and CAN Optional	RS485/RS232 / Ethernet; USB and CAN Optional
Standard warranty(Year)	5	5	5	5

5 Installation

5.1 Packaging list

Please Check the package list, find out all these in the package. The product on the list are for installation. If find some damage or missing, please contact Samil Power's sales. Please see table 1.

Description	QTY	Remark
SolarLake inverter	1	Screw package: 2M4screws, 5ø6screws, 5 expansion screws
Bracket	1	
Screw package	1	
RJ45	2	
Input DC connector	8	
Product manual	1	
Warranty card	1	
Packing list	1	
Quality certificate	1	

Table 1 Packing list

5.2 Installation precaution

Warning!

Before installation and maintenance,AC and DC side doesn't carry electricity, but if DC side is just disconnected, capacitance still contains electricity, so please wait for at least 5 minutes to ensure the capacitors completely release the energy and inverter is not electrified.

Note!

Inverters must be installed by qualified person.

SamilPower assures the product guarantee of the SolarLake series inverters during five years after your purchase, if the installation site does not meet the instructions described in this manual, it is out of warranty. The warranty is limited to the costs of repair and/or replacement of the product by Samil Power only.

Ventilation is very important to cool the inverter, For outdoors application, the inverter requires at least 50 cm (see table 2) of clearance among the other units and ground. it is recommended that the same clearance(50cm).

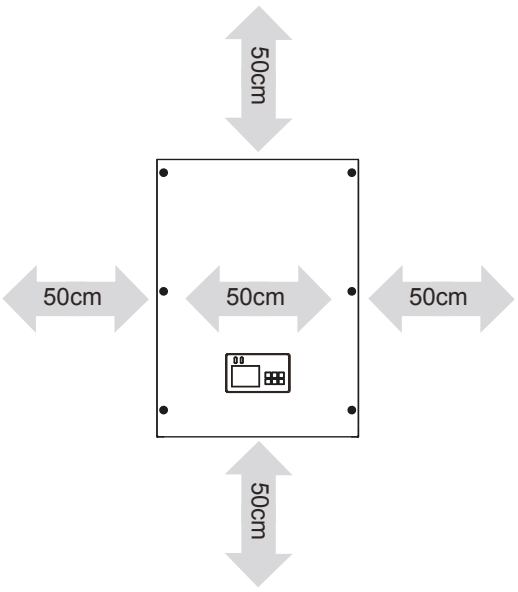


Figure 6 Space specification

Position	Min. Size
Side	50cm
Top	50cm
Bottom	50cm
Front	50cm

Table 2 Available space size

5.3 Preparation

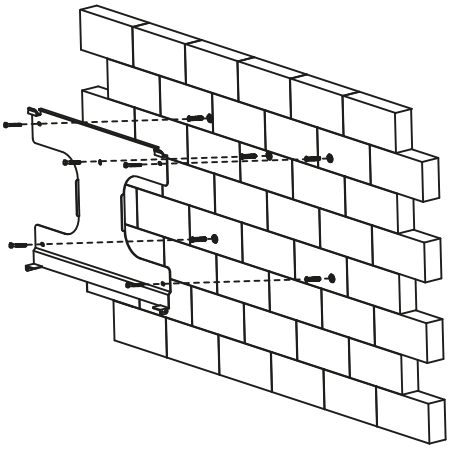
Below tools are needed before installation.

Figure 7 Installation tools

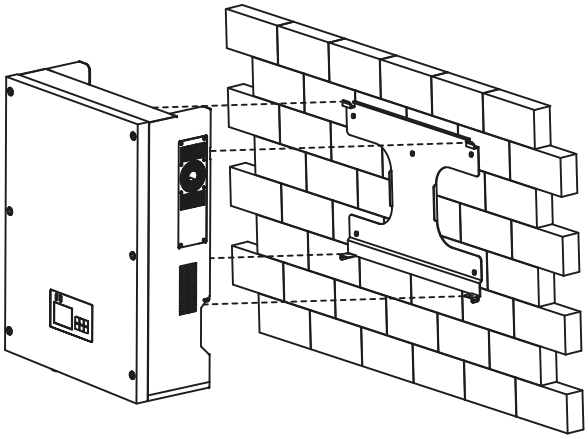
Installation Tools: crimping pliers for binding post and RJ45, screw drivers and manual wrench and ø 8 driller, rubber hammer.

5.4 Installation Steps

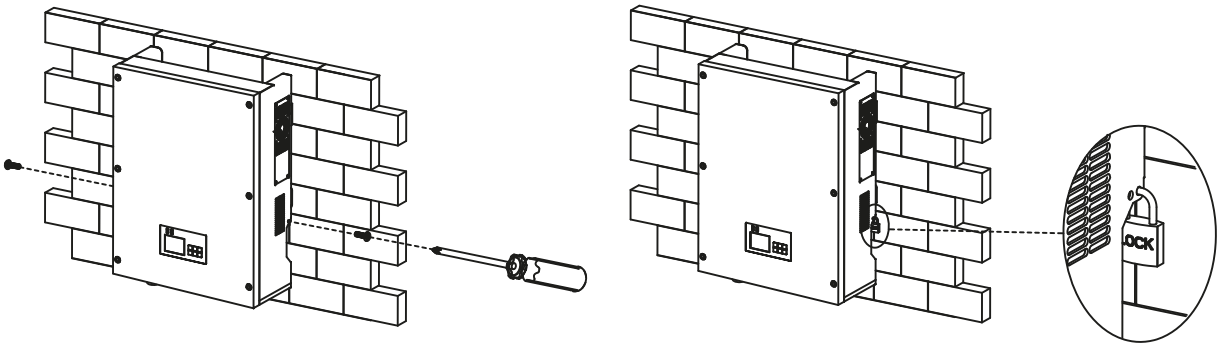
Step1: Drill holes in the wall with ø 8 driller according to the size of bracket. Keep drilling vertical to the wall, and don't shake when drilling to avoid damage to the wall. It need repositioning and drilling holes if the hole with much error. Then put expansion pipe into the hole vertically, use rubber hammer to tap the pipe into the wall completely. After that, 5 screws should be twisted into pipes with bracket. See step 1.



Step 1



Step 2



Step 3 **Step 4**

Figure 8 Bracket installation

Step2: Use the bracket to install the inverter onto the narrow vertical panel (or wall). make upper corner part of inverter hanging onto the bracket, lower part match the standard of the bracket.See step 2.

Step3: Make sure the bracket and the inverter side screw holes in a line and matching well, put the screw(there are left and right 2 screws) into the hole and drive into the inverter tightly. See step 3.

Step4: Lock the inverter and the bracket with lock for safety consideration. (This is optional for users. User can select the lock according to your requirements).See step 4.

5.5 Connections of the PV power system

●PV String input connection

SolarLake series inverters (SolarLake 10000TL, SolarLake 12000TL, SolarLake 15000TL and SolarLake 17000TL) can be connected to 2 PV string groups, each group can divided into 2-strings PV modules. Please select PV modules with excellent function and reliable quality. Open-circuit voltage of module arrays connected in series should be ＜Max. Input DC (Table 3) input voltage; operating voltage should be conformed to MPPT voltage range.

Model	SolarLake 10000TL	SolarLake 12000TL	SolarLake 15000TL	SolarLake 17000TL
Max. Input DC voltage	1000 V			

Table 3 Max. DC Voltage Limitation

Please use PV cable to connect modules to inverter. From junction box(Must have fuse spec.:1000V, 25A fast action) to inverter, voltage drop is about 1-2%. So we suggest the inverter install near PV module, in order to save cable and reduce DC loss.

Note!
Please don't connect the PV panel positive or negative to ground. And do not apply for thin film panel.

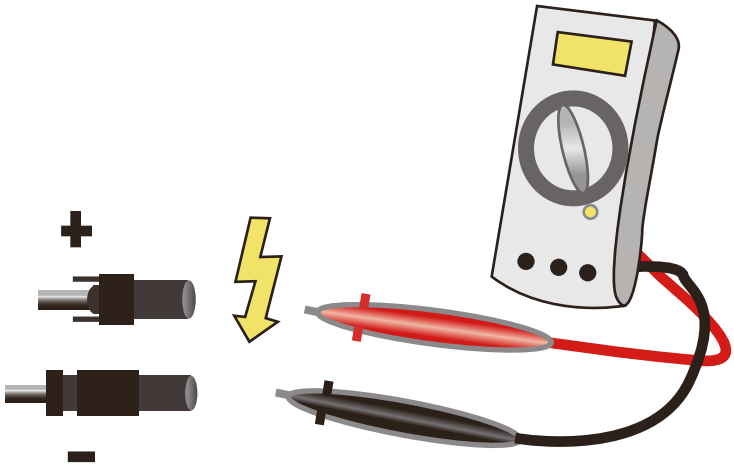


Figure 9 Use multimeter to measure module array voltage and detect the polarity

Note : Check the PV+ and PV- from the PV string combiner box correctly, Make sure the PV+ and PV- are connected correctly.

Warning!
PV module voltage is very high which belongs to dangerous voltage range, please comply with electric safety rules when connecting.

Warning!
When there is something wrong with module arrays, modules can be connected with PV grid-tied inverter only after eliminating these problems.

Please use PV cable to connect modules to inverter. From junction box(Must have fuse spec.:1000V, 25A fast action) to inverter, voltage drop is about 1-2%. So we suggest the inverter install near PV module, in order to save cable and reduce DC loss.

Note!
Please don't connect the PV panel positive or negative to ground. And do not apply for thin film panel.

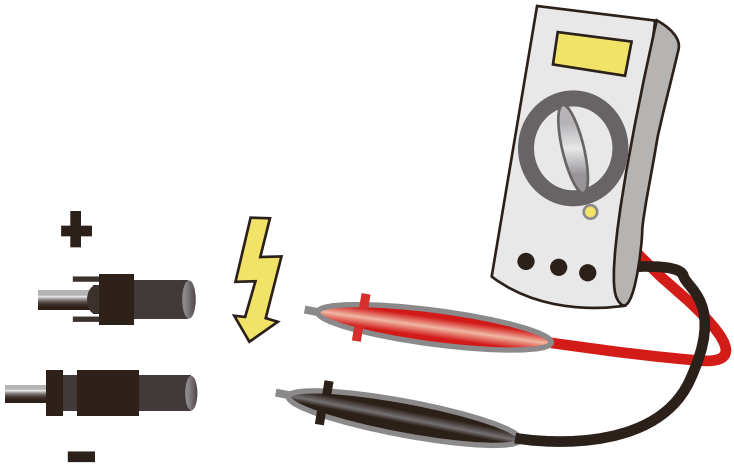


Figure 9 Use multimeter to measure module array voltage and detect the polarity

Note : Check the PV+ and PV- from the PV string combiner box correctly, Make sure the PV+ and PV- are connected correctly.

Warning!
PV module voltage is very high which belongs to dangerous voltage range, please comply with electric safety rules when connecting.

Warning!
When there is something wrong with module arrays, modules can be connected with PV grid-tied inverter only after eliminating these problems.

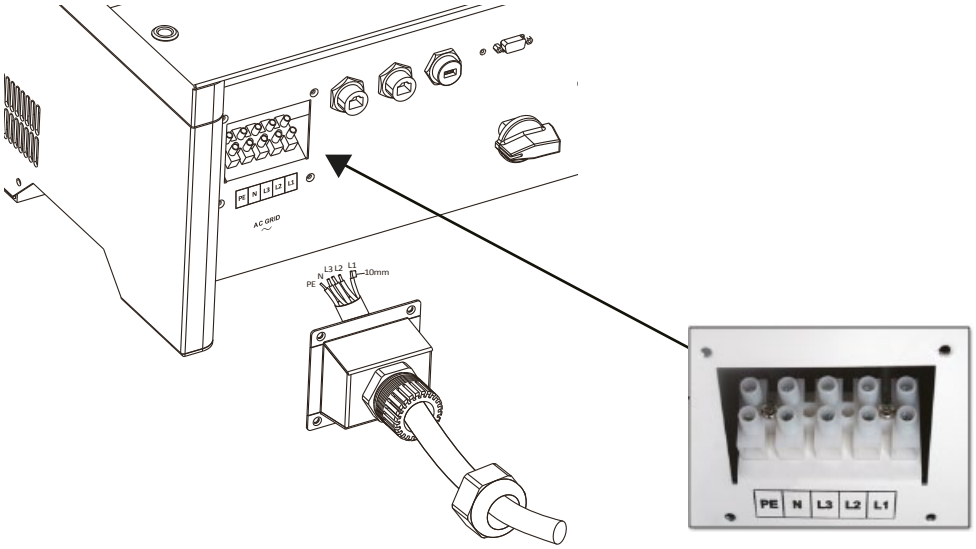


Figure 11 AC output area with terminal block for 5 wires of cable

Below is the AC cable specification table when select the cable for installation.

Model	SolarLake 10000TL	SolarLake 12000TL	SolarLake 15000TL	SolarLake 17000TL
Cable (Cu)	≥4mm^2	≥4mm^2	≥6mm^2	≥6mm^2
Micro-Breaker	25A	25A	32A	32A

Table 4 Cable and Micro-breaker Requirement

Note: For safety reasons,make sure you select the correct specification cables for installation, otherwise the power will make the cable hot and overload, it could result in death or serious injury.

Below are the steps for AC output wiring.

Step1: Get out of the four screws at four corners of the cover, get off the cover.

Step2: There are 5 white terminals, which are PE, N, L3(T), L2(S), L1(R). Put the 5 wire of AC cable through the house tunnel, then put the wire into the terminals correctly(make sure the phase sequence is correctly connected）.

Step3: After 5 wires are connected with terminals please check the wire is in right location. (L wire is connected with L terminal)

Step4: Put the terminal house on the terminals, get four screws on.

RCMU breaker should be installed between inverter and grid, and its rated fault current: 100 mA≤Ifn≤300 mA，0.1S，Any load should not be connected with inverter directly.

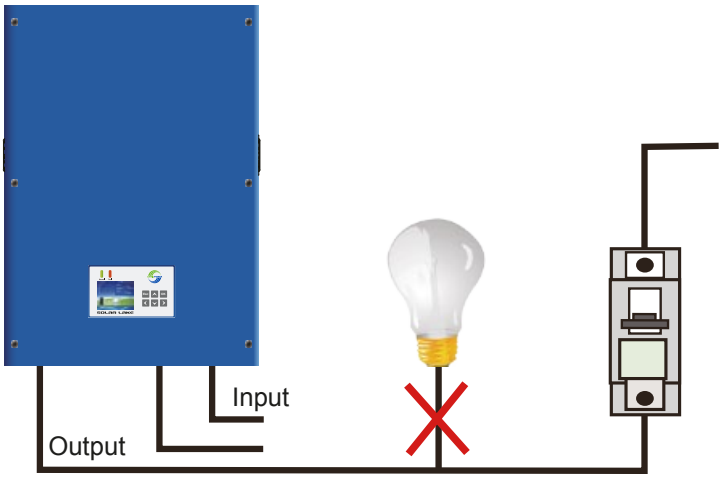


Figure 12 Incorrect Connections between Load and Inverter

Impedance of SolarLake inverter AC connecting dot should be less than 2 Ω. To ensure reliable anti-islanding function , PV cable should be used to ensure wire loss ＜1% than normal power. Moreover, length between AC side and grid connecting dot should be less than 150m. Below chart is cable length, section area and wire loss.

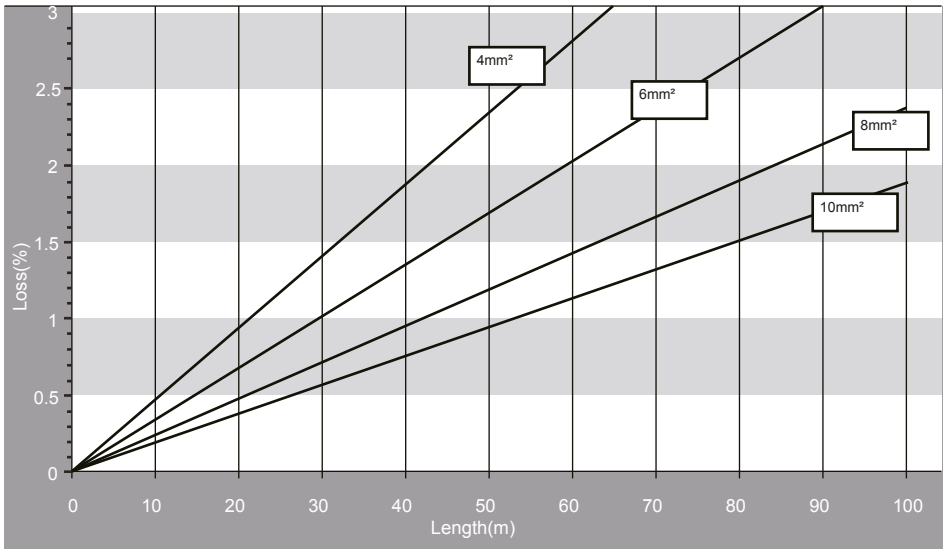


Figure 13 AC Cable Loss

5.6 Run the inverter

Start inverter after checking all below steps

a. Make sure all the DC Switch and AC breaker are disconnect.

b. AC cable is connected to grid correctly.

c. All PV modules are connected to inverter correctly，DC connectors which are not used should be sealed by cover.

Start inverter

a. Turn on DC switch and AC grid.

b. Inverter will start up automatically when PV panels generate enough energy. when operating normally, the LED and LCD will indicate normal information which means inverter starting up successfully. If it is the first time start the inverter Please refer to chapter 6.1 .1 LCD commission -ing setup operation steps, if it is not the first time start, find the inverter is malfunction, please refer to chapter 8.1 troubleshooting table.

Note!
If inverter shows “Fault” status, please refer to Part 8 troubleshooting

6 Operation

6.1 Control and Display Panel(Figure 14)

Figure 14 Display and control panel

There are 6 buttons: **OK, ESC, UP, DOWN, RIGHT, LEFT.**

OK button: confirm the selection.

ESC button: exit current screen or selection

UP button: move cursor to up selection or increase the values

DOWN button: move cursor to down or decrease the values.

RIGHT button: move cursor to right side or increase the backlight.

LEFT button: move cursor to left side or decrease the backlight.

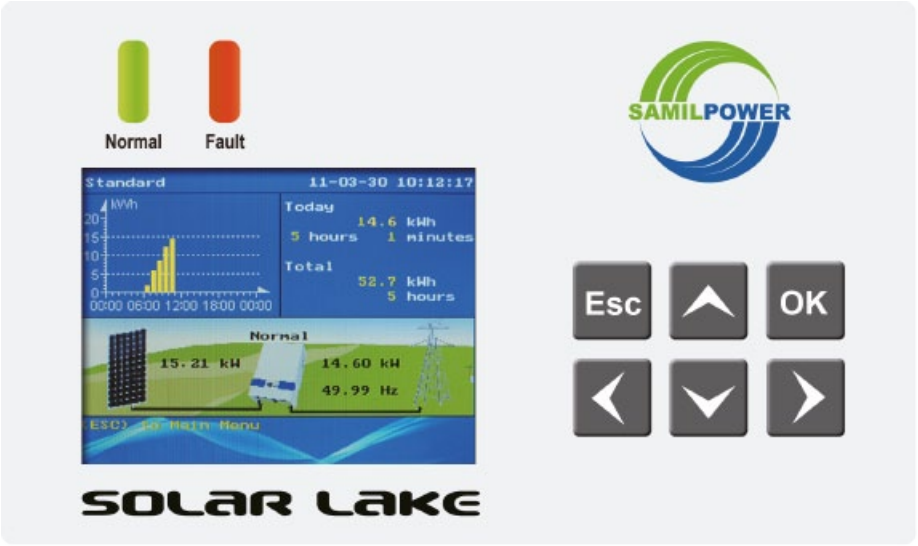


Figure 15 HMI Interface

There are two LEDS on the panel. Different LED status means inverter different working statutes.

Information List	GREEN LED	RED LED
WaitState	FLASH	X
ICheckState	FLASH	X
NormalState	ON	X
FaultState	OFF	ON
PermanentState	OFF	ON

Table 5 LED status

WaitState: Inverter is waiting to CheckState until the end of reconnection time. In this state, the PV voltage is more than 250V and grid voltage value is between the max and min limit; Otherwise, Inverter will go to FaultState or PermernentState.

CheckState: Inverter will check isolation resistor, relays, and other safety requirements. It will also do self-test to ensure inverter software and hardware are functional. Inverter will go to FaultState or PermernentState if any error or fault occurs.

NormalState: Inverter feeds to grid energy from PV panel as much as possible according MPP trackers. Inverter will go to FaultState or PermernentState if any error or fault occurs.

FaultState: Inverter has occurred some recoverable error. It can recover if the errors disappear. If FaultState exist continually, you should check the inverter according error code in table 6,7,8.

PermenentState: Inverter has occurred some unrecoverable error. It will stay in PermenentState. You should take some measure according the error code.

6.1.1 LCD commissioning setup operation steps

Step1: Start-up screen display

When user first time start the inverter, the LCD will display start-up picture. See figure 16. Press OK button to start commissioning procedure.

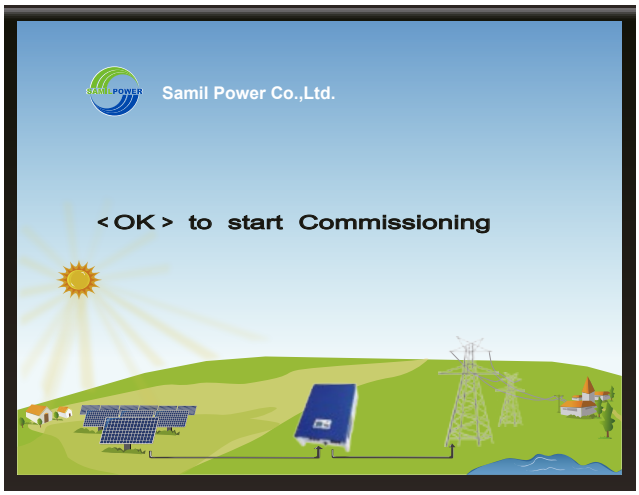


Figure 16 Start-up screen (step 1)

Step2: Language setting

Following select display language via UP and DOWN buttons. Please see figure 17.

Figure 17 Language setting (step 2)

Note that language is nothing to do with the county safety setting. Users can use UP and DOWN buttons to select the language, the press OK button to confirm the selection.

Step3: Country setting

Following screen is country setting. Press UP, DOWN, RIGHT and LEFT buttons to select the country which apply to user local grid regulations. Then press OK button to confirm the selection. See figure 18.

Figure 18 Country and safety setting (Step 3)

Step 4: String input connection setting.

Next screen is the string input connection setting. User can select the input connection type according to the requirements via UP and DOWN buttons. Then press OK button to confirm the selection. See figure 19.

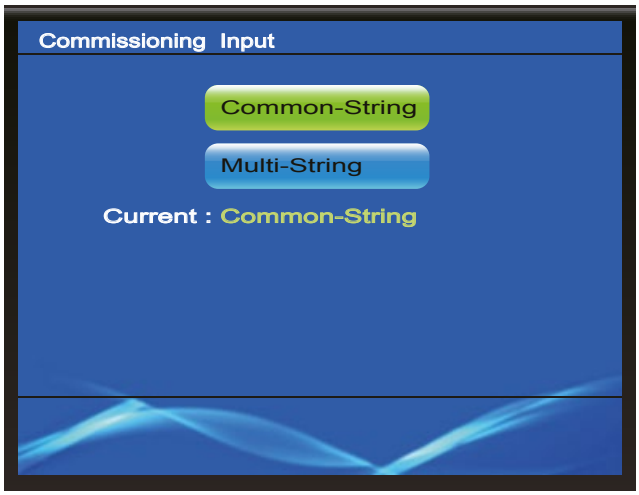


Figure 19 String input connection setting (Step 4)

Step 5: Date and time setting.

Setting the date according to your local date and time. Please use LEFT and RIGHT button to move curse, the UP and DOWN button will change the value. Then press OK button to confirm the selection. See figure 20.

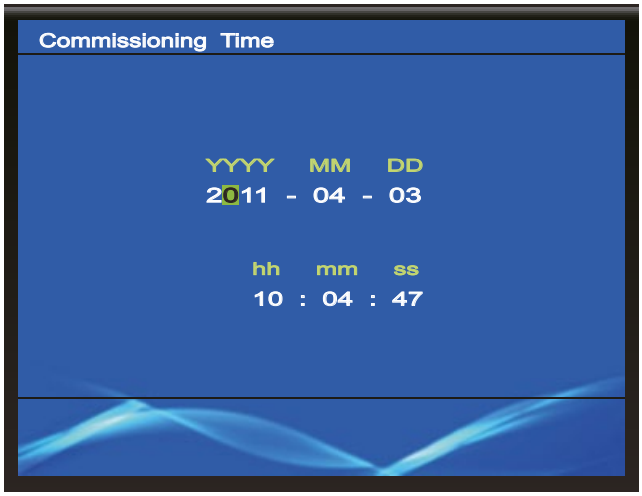


Figure 20 Date and time setting (Step 5)

Step 6: Check and confirm commissioning setting information.

If the setting information are correct, please press OK button to confirm and wait for about 30 seconds to store the setting parameter. If the setting information does not meet requirements, please press ESC button to reselect your setting. See figure 21.

Figure 21 Setting information checking (Step 6)

Step7: Enter standard screen.

Confirm the setting parameters then the commissioning is complete. See figure 22.

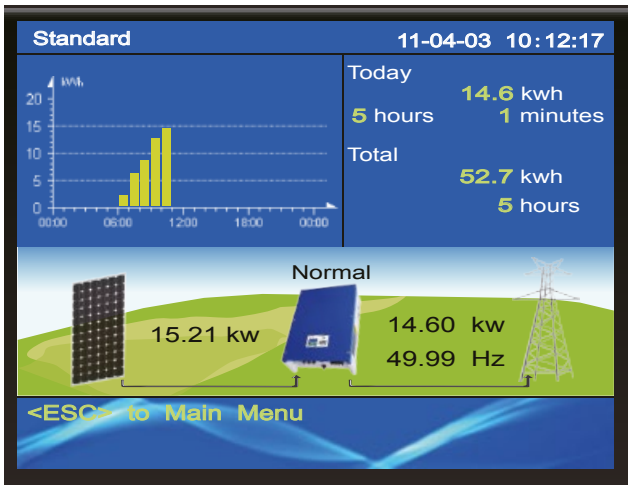


Figure 22 Standard screen (Step 7)

6.1.2 Main menu introduction

Enter main screen from standard screen via Pressing ESC button to get into main screen, see figure 23.

Figure 23 Main menu

Move selection on “instantaneous” press OK button, user will get detail information about the input and output power, and also the temp.

Move selection on “history” press OK button, user will get detail information about production today, PV power today, AC power today, Day production this month, Month production this year and last 20 year production(User can change pages via press LEFT and RIGHT buttons) .

Move selection on “Event List” press OK button, user will get detail information about what happened to product. The max event number is 100 pieces. User can get all event list Press UP and DOWN button to select the event, then press OK to check the event occurred

detail information(time, error code); press ESC to exit current screen.

Move selection on “Setting” press OK button, user will get detail information about the setting items. Press UP and DOWN, LEFT and RIGHT buttons to selection item, finally press OK button to get into that item user select. See figure 24.

Figure 24 Setting screen

Note that if you want to re-set Country, Input and Factory Set, user need password to get into the item for setting. This requires security password to change. You can ask help from qualified technical support.

6.1.3 Autotest procedure- Italy only

Only country setting is Italy during commissioning, Enter main menu then enter setting sub-menu, select AutoTest Ita. to run, an automatic test of the inverter will initialed by software, user can get the information via the LCD.**(Main menu→Settings→AutoTest Ita.)** See figure 25.

Figure 25 Autotest selection for Italy only

Make sure during commissioning the country is Italy, then inverter can do self-test automatically follow above instructions.

Operate a new AutoTest procedure

1.Before performing the AutoTest, confirm the country setting is “Italy” and the inverter is running in normal state.

2.On the display Main Menu find (Settings→ AutoTest Ita.) and press OK, then select “New Autotest” , press OK , the LCD will be cleared, wait a few seconds, and you can see “(OK) to start Grid R V_max” on the LCD.

3.Press OK button to start grid R V_max test, or press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid until test is over.

4.After grid R V_max test is over, the LCD will show the result and “(OK) to start V_min”, and the inverter will reconnect automatically.

5.Then press OK button to start grid R V_min test. Alternatively press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid until test is over.

6.After grid R V_min test is over, the LCD will show the result and “(OK) to start F_max” , and the inverter will reconnect automatically.

7.Then, press OK button to start grid R F_max test. Alternatively press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid untill this test is over.

8.After grid R F_max test is over, the LCD will show the result and “(OK) to start F_min” , and the inverter will reconnect automatically.

9.Then, press OK button to start grid R F_min test. Alternatively press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid untill this test is over.

10.After grid R F_min test is over, the LCD will show the result and “(OK) to start Grid S V_max” , and the inverter will reconnect automatically.

11.Then, press OK button to start grid S V_max test. Alternatively press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid untill this test is over.

12.After grid S V_max test is over, the LCD will show the result and “(OK) to start V_min”, and the inverter will reconnect automatically.

13.Then, press OK button to start grid S V_min test. Alternatively press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid untill this test is over.
14.After grid S V_min test is over, the LCD will show the result and “(OK) to start F_max”, and the inverter will reconnect automatically.
15.Then, press OK button to start grid S F_max test. Alternatively press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid untill this test is over.
16.After grid S F_max test is over, the LCD will show the result and “(OK) to start F_min”, and the inverter will reconnect automatically.
17.Then, press OK button to start grid S F_min test. Alternatively press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid untill this test is over.
18.After grid S F_min test is over, the LCD will show the result and “(OK) to start Grid T V_max”, and the inverter will reconnect automatically.
19.Then, press OK button to start grid T V_max test. Alternatively press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid untill this test is over.
20.After grid T V_max test is over, the LCD will show the result and “(OK) to start V_min”, and the inverter will reconnect automatically.
21.Then, press OK button to start grid T V_min test. Alternatively press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid untill this test is over.
22.After grid T V_min test is over, the LCD will show the result and “(OK) to start F_max”, and the inverter will reconnect automatically.
23.Then, press OK button to start grid T F_max test. Alternatively press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid untill this test is over.
24.After grid T F_max test is over, the LCD will show the result and “(OK) to start F_min”, and the inverter will reconnect automatically.
25.Then, press OK button to start grid T F_min test. Alternatively press ESC button to exit from “New Autotest”. If there is no button operation within 5 seconds, the test will start automatically. If the test has started, key operation is invalid untill this test is over.

26.After grid T F_min test is over, the LCD will show the result and “(Esc) to exit”, and the inverter will reconnect automatically.

27.The autotest function is considered successful once all the previous 12 tests have been performed. When LCD shows “(Esc) to exit”, press ESC button to exit from “New Autotest” .

Note: If an unexpected disconnection requirement occurs during the autotest, the autotest is interrupted. The LCD will show "AutoTest break! (OK) to exit". Press OK button or ESC button to exit from “New Autotest” . Then, disconnect the AC breaker from all 3 phases and prevent it from being reactivated, disconnect the DC switch for 5 minutes and connect it again. The inverter is now in the initialization and you can restart the autotest procedure.

Note: If user exit from “New Autotest” when any of the previous 12 tests be not performed yet, the inverter will not record any of the test results.

Procedure of viewing AutoTest results from the inverter’s LCD

Enter Main Menu, then enter Settings sub-menu, select “AutoTest Ita.” and enter it, then select “Last Results” , press OK button, the LCD will show the latest several results’ time in terms of a list. The lattest result shows on the top.

Press DOWN or UP button to select one result and press OK button to view the detail. When entering the detail screen, test results of grid R are shown, press RIGHT or LEFT button to view other phases’ results. Press ESC button to exit from detail screen.

Procedure of viewing AutoTest results from PC.

Note: After a new AutoTest finished, the results’ data will be sent to PC through the RS-232 port between the inverter and PC, one “txt” format report will be created automatically. The detailed operation procedures are as follows:

28. Open the “Enel.exe” file shown in Figure 26 in PC(User can download “Enel.exe” application software from www.samilpower.com), one "Report" folder will produced at the same directory with “Enel.exe“ file , and each time “txt” format report generated will be stored to the "Report" folder, as shown in Figure 27.

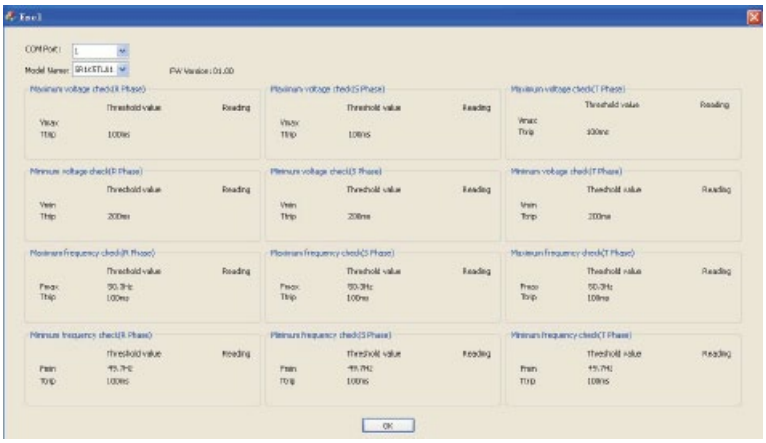


Figure 26

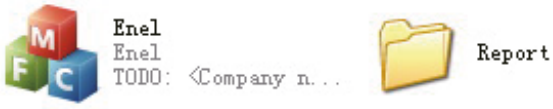
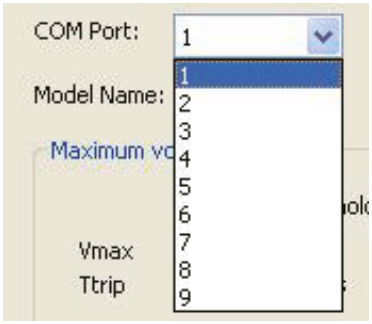


Figure 27

29. Select the corresponding models and communication port(PC and the inverter connection port: com1 ~ com9), as shown in Figure 28 and Figure 29.



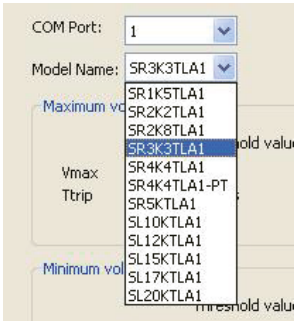


Figure 28 Select inverter module Figure 29 Select communication port

30. Then click "OK" button, “Enel.exe” software automatically reads the inverter’s LATEST test data, and generates a “txt” format report, as shown in Figure 30 and Figure 31.

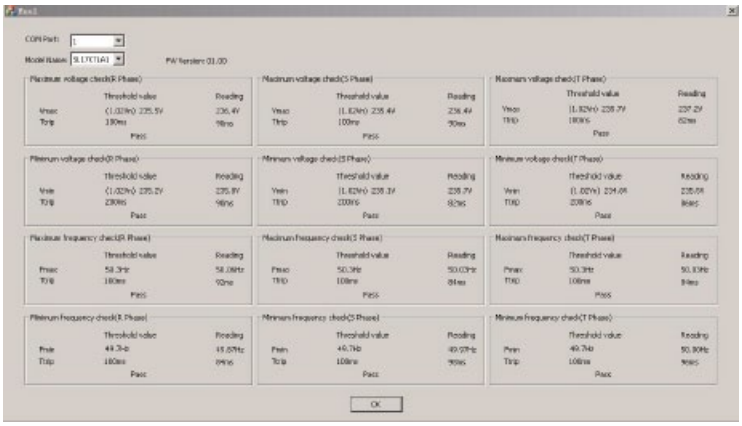


Figure 30

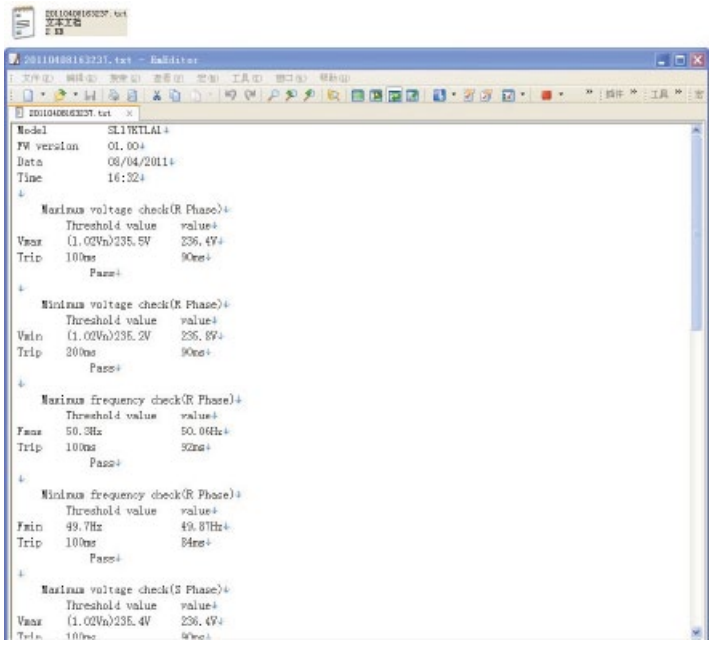


Figure 31

31. If you click “OK” button, one warning message as shown in Figure 32 appears, please check the RS-232 communication connection between the Inverter and PC.

Figure 32

6.2 LCD Function

LCD shows the most of power information user cares. When the inverter operates normally, user touch any button, then the backlight is on, user will see the main screen.

If none key touching in 60 seconds, the backlight will be off. After that user touch any button, the backlight will be on.

Note that If no operation in 60 seconds, the backlight will goes off. In next 10 seconds if still no operation the screen will back to standard screen, otherwise the backlight will be illuminated.

Just recovering default setting and Italy autotest ongoing both are exception, the backlight will be on all the time.

7. Communication and Monitoring

7.1 Communication Interface

This product has a communication interface RS232, RS485 and Ethernet interface,(USB and CAN is optional) Samil Power can offer customer USB and CAN communication interface. Operating information like output voltage, current, frequency, fault information, etc., can be delivered to PC or hardware storage devices or other monitoring equipment via communication interface.

7.2 Communication

When user want to know the information of the power station and manage the entire power system. We offer below 4 types communications.

RS232 Communication for single inverter type

RS232 is one communication interface. It transmits the data between PC and one single SolarLake series inverters (Figure 33). For communication cable, one end is male connector; the other end is female connector.

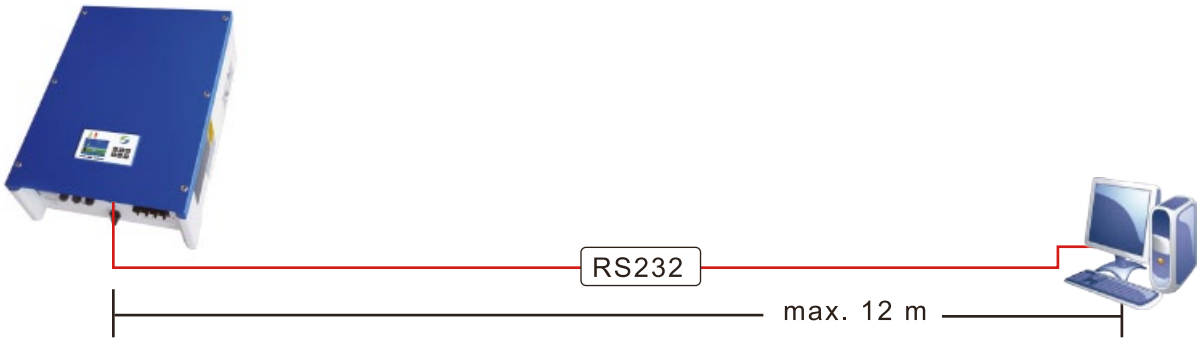


Figure 33 RS232 Communication Diagram

One inverter can only be communicated with one PC at the same time through RS232 port. Thus this method is generally used for single inverter's communication, for examples, software updating and serviceman's testing.

RS485 Communication for Several inverters

RS485 is generally for multi inverters' communication. Up to 32 inverters could communicate at the same time, but wire length should be≤1200m. System monitor SolarPower Manager should be configured to realize one PC communicates with multi inverters at the same time. Through PC SolarPower Manager could get real time PV plants operating data. Please see Installation Guide of SolarPower Manager for more information. Connect the system as blow (Figure34), user can easily monitoring the PV power station.

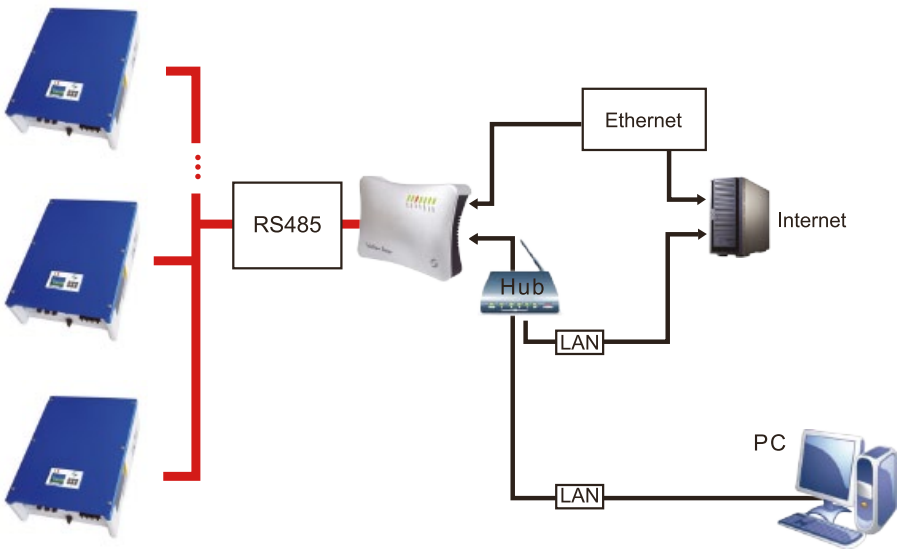


Figure 34 SolarPower Manager Monitoring Diagram

USB interface:

User can easily get the data into your storage device from this interface.

Ethernet communication:

User can connect inverter with the router (the router is not special for inverters, user can get any brand in the market.) according to the requirements, then user can check the inverter's data in any place of the world.

8 Troubleshooting

8.1 Troubleshooting

This section contains information and procedures for solving possible problems with the SolarLake series inverters, and provides user with troubleshooting tips to identify and solve most problems that could occur with the SolarLake series inverters.

This section will help user narrow down the source of any problems user may encounter.

Please read the following troubleshooting steps.

● Check the warning or fault messages on the System Control Panel or Fault codes on the inverter information panel. If a message is displayed, record it before doing anything further.

● Attempt the solution indicated in table 6 ,7,8.

● If userr inverter information panel is not displaying a Fault light, check the following list to make sure that the present state of the installation allows proper operation of the unit.

— Is the inverter located in a clean, dry, adequately ventilated place?

— Have the DC input breakers been opened?

— Are the cables adequately sized and short enough?

— Are the input and output connections and wiring in good condition?

— Are the configurations settings correct for user particular installation?

—Are the display panel and the communications cable properly connected and undamaged?

Contact Samil Power Customer Service for further assistance. Please be prepared to describe details of user system installation and provide the model and serial number of the unit.

Error code program:

Group	IDinGroup	Description	Suggested operation and solution
Grid	0	VGridROverRating	Grid is out of range; check that the AC installation is correct according to the manual and that all values are within their specified limits. If the inverter resumes fault operation, please call support.
	1	VGridRUnderRating	
	2	VGridSOverRating	
	3	VGridSUnderRating	
	4	VGridTOverRating	
	5	VGridTUnderRating	
	6	FreGridOverRating	
	7	FreGridUnderRating	
	8	DCIGridROverLimit	
	9	DCIGridSOverLimit	
	10	DCIGridTOverLimit	
	11	FreGridROverRating	
	12	FreGridRUnderRating	
	13	FreGridSOverRating	
	14	FreGridSUnderRating	
	15	FreGridTOverRating	
	16	FreGridTUnderRating	
PV	0	Pv1VoltOvrFault	Make a visual inspection of all PV cables and strings. Check the installation is correct according to the installation steps. If the inverter resumes fault operation, please call support.
	1	Pv2VoltOvrFault	
	2	PvVoltLowFault	
	3	PvVoltOvrFault	
	4	Pv1IsoFault	
	5	Pv2IsoFault	
	6	GFCIFault	
	7	GFCIJump1Fault	
	8	GFCIJump2Fault	
	9	GFCIJump3Fault	
	10	GFCIOver300mAFault	

Table 6

Group	IDinGroup	Description	Suggested operation and solution
Inverter	0	Commission	No operation
	1	CommBoardPowerUp	
	2	CtrlBoradPowerUp	
	3	CtrlBoradPowerDown	
	4	RTC2ReadFault	
	5	RTC2WriteFault	Turn off both AC and DC power to the inverter, once the inverter has lost power turn the AC and DC back on. If the inverter resumes permanent fault or fault operation, please call support.corresponding to your act -ual connection.
	6	EEPROM2ReadFault	
	7	EEPROM2WriteFault	
	8	Comm2LoseFault	
	9~29	NOT USED	
	30	CommLoseFault	
	31	RChipFault	
	32	AuxPower_Fault	
	33	OverTempFault	
	34	PLLFault	
	35	BusVoltLowFault	
	36	BusVoltOvrFault	
	37	BusUnbalance	
	38	HW_BusOVP_Fault	
	39	HW_OCP_AC	
	40	HW_OCP_Boost	
	41	OCP_AC_RMS	
	43	AutoTestFail	
	45	HWADFault_VGrid	
	46	HWADFault_IGrid	
	47	HWADFault_DCI	
	48	HWADFault_GFCI	
	49	NOT USED	
	50	unrecoverHW_OCP_AC	
	51	unrecoverBus_OVP_Fault	
	52	unrecoverBoost1_OCP	
	53	unrecoverBoost2_OCP	
	54	unrecoverSW_OCP_AC	
	55	RelayShort	
	56	RelayOpen	
	57	IAC_RMS_Unbalance	

Continued:

Group	IDinGroup	Description	Suggested operation and solution
Inverter	42	PvConfigSet_Wrong	Check the PV string connection type, make sure your commis -sioning input setting cor- responding to your actual connection.
	44	Unrecoverphasesequencefault	Exchange the L1 and L2 wire, make sure DC switch and AC grid are off before re-wiring.
	58	DcFanXFault(fan1,2,3,4)	Check the fan working status, if it is out of work, please contact support for replace.

Table 7

Group	IDinGroup	Description	Suggested operation and solution
User	0	LcdEmergencyStop	No operation
	1	Language	
	2	Time	
	3	Country	
	4	Input	
	5	ClearProd	
	6	ClearEvent	
	7	ReFactorySet	
	8	LCDBright	
	9	LCDlightTime	
	10	Network	

Table 8

8.2 Routine Maintenance

Inverters generally do not need any maintenance or correction, but need to ensure cooling fan not be covered by any dust or dirties.

●Inverter cleaning

Please use electric compressing dryer, soft dry cloth or brush to clean inverters. Water, corrosive chemical substance or intense cleaning agent is not allowed to clean the cooling fan.

●Cooling fin cleaning

To ensure inverter performance and long-period usage, back heat emitter needs to be left with available space, side fan cannot be covered with dust or snow as it will affect airflow. Please use compressing air, soft cloth or brush to clean cooling fin, not water, corrosive chemical substance or intense cleaning agent.

9 Decommissioning

9.1 Decommissioning steps.

1 switch off the AC grid

2 Switch Off the DC switch

3 Wait for 5 minutes

4 Release the DC connectors

5 Release the AC terminals via screw drivers.

Now inverters can be demounted in a safe way.

9.2 Packaging

If possible, please pack the inverter with the original packaging.If it is no longer available, user can also use an equivalent carton that meets the following requirements: Suitable for loads more than 50 kg;With handle;Can be fully closed.

9.3 Storage

Store the inverter in dry place where ambient temperatures are always between -25 °C ~ +70 °C.

9.4 Disposal

Please be sure to deliver inverters at the end of its service and packing materials to certain site (it should apply disposal regulations for electronic scrap), where can assist relevant department to dispose and recycle.

10 Contact Samil Power

If user has any questions about SolarLake series inverter, please call service support hotline: +86 510 83593131. Please keep following information to better our service for user.

a.Inverter’s Model.

b.Inverter’s Serial No.

c.Communication Method.

d.PV modules’ Model.